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As λ decreases, therefore, $\max n_1$ increases until $\lambda^2 = \sqrt{2} - 1$, when it has the value $0.0148\dots$. It then decreases, approaching 0 with λ .

In similar manner, the equation of the ellipse, referred to R' as pole and a horizontal through R' as initial line, is

$$\rho/a = \frac{1}{\sqrt{1+\lambda^2}} \left[\frac{\sqrt{3}(1-\lambda^2)s + \lambda\sqrt{2(1-\lambda^2)(2-\lambda^2)s^2 - (3-\lambda^2)(1-2\lambda^2)}}{(1-\lambda^2)s^2 + \lambda^2} \right],$$

where $s = \sin \theta$. For the circle $\rho'/a = 1 + \frac{1-\lambda^2}{\sqrt{1+\lambda^2}}$

$|(\rho' - \rho)/a| = n_2$ will be the relative normal divergence for these arcs. Critical values of θ are found from an equation which in simplified form becomes

$$\sqrt{1-s^2} [(1-\lambda^2)s^2 + \lambda^2]^2 [2(2-\lambda^2)s^2 - 3] = 0.$$

For $s = 1$, $\theta = 90^\circ$, we have the vertical divergence discussed previously. The other real critical value is given by

$$s = + \sqrt{\frac{3}{2(2-\lambda^2)}}, \quad \lambda^2 \leq \frac{1}{2}.$$

The corresponding maximum is

$$|n_2| = \frac{\sqrt{2(2-\lambda^2)}}{\sqrt{1+\lambda^2}} - \frac{1-\lambda^2}{\sqrt{1+\lambda^2}} - 1.$$

The three typical cases, computed above, give the following results:

λ	$\max n_1 $ $s^2 = \frac{1}{2}$	$\max n_2 $	
		$s = 1$	$s = + \sqrt{\frac{3}{2(2-\lambda^2)}}$
$\frac{3}{4}$	0.0137	0.0062	—
$\frac{1}{\sqrt{3}}$	0.0145	0.0000	0.0038
$\frac{5}{12}$	0.0106	0.0249	0.0014

DISCUSSIONS.

RELATING TO THE INDETERMINATE FORM 0/0.

By M. O. TRIPP, Olivet College, Olivet, Michigan.

In the May, 1916, number of the MONTHLY (Vol. XXIII, p. 180) Professor J. W. Nicholson considers the equation

$$y = \frac{x^2 - a^2}{x - a}, \quad (1)$$

and draws the conclusion that for $x = a$, y has a definite and also an indeterminate value. The object of this note is to show that we are not warranted in drawing such a conclusion.

When we clear (1) of fractions by multiplying both sides by $x - a$ and consider $(x - a)/(x - a)$ as having the value unity, we are at liberty to do so only upon condition that $x \neq a$.

Geometrically it is clear that when $x = a$ we are not warranted in drawing the conclusion that $y = 2a$ and $y = 0/0$. For, let x take a series of values from $x = a - d$ to $x = a + d$, ($d > 0$). When $x \neq a$, $y = x + a$. Hence the co-ordinates of a point on the curve (1) satisfy the equation $y = x + a$, when $x \neq a$; but when $x = a$ we are not warranted in drawing the conclusion that y is necessarily equal to $2a$.

If we trace the locus of (1) from $x = a - d$ to $x = a + d$, we follow the straight line $y = x + a$ until we come to the point where $x = a$, then expand upward and downward to infinity vertically. As we pass on through $x = a$ the locus again follows the curve $y = x + a$. When $x = a$ in (1) we get the result that y is always genuinely indeterminate and does not take a definite value.

Note. The above discussion is published, as was Mr. Nicholson's, because of the interest which the subject possesses for many instructors.

In general, we take for granted that a function exists only where it has been defined. Consequently it seems to us that no amount of argument can get anywhere concerning the function in question for $x = a$ until the function has been defined for $x = a$, and when the function has been defined for $x = a$ the cause for argument disappears.

Neither Mr. Nicholson nor Mr. Tripp defines the function in question for $x = a$. In equation (1) of either paper, $y = x + a$ for $x \neq a$ and is not defined for $x = a$. Mr. Nicholson says (1) consists of two loci, but forgets that he introduces one of them, $x - a = 0$, when he multiplies both members of (1) by $x - a$.—U. G. M.

NOTES AND NEWS.

EDITED BY D. A. ROTHROCK, Indiana University, Bloomington, Ind.

After April 20, 1917, all communications to the Secretary, Professor W. D. CAIRNS, should be addressed to 55 East Lorain Street, Oberlin, Ohio, whither he is returning after a sojourn of seven months at the University of Chicago.

Dr. V. M. SLIPHER, for a number of years chief assistant at the Lowell Observatory, Flagstaff, Arizona, has been promoted to the directorship of the observatory, succeeding the late Percival Lowell.

Dr. EDWARD KIRCHER, Benjamin Peirce instructor in mathematics at Harvard University for the past two years, has accepted an instructorship in mathematics at the University of Minnesota.

CHARLES J. WHITE, emeritus professor of mathematics at Harvard University, died on February 12, at the age of seventy-eight years.